

Yogoda Satsanga Palpara Mahavidyalaya

DEPARTMENT OF CHEMISTRY

TEACHING PLANE CHEMISTRY (Honours) (Session-2021-2022)

Semester	Paper	Unit/Module		Teacher	No. of lectures	To be completed by
Semester-1	CC-1 :ORGANIC CHEMISTRY-I	Basics of Organic Chemistry		Sudip Maity	20	1 st Month and 2 nd month
		Bonding and Physical Properties	Valence Bond Theory			
			Electronic Displacements			
			MO theory			
			Physical properties			
		General Treatment of Reaction Mechanism I	Mechanistic classification: ionic, radical and pericyclic	Sudip Maity	20	3 rd , 4 th and 5 th Month
			Reactive Intermediates			
		Stereochemistry I	Bonding geometries of carbon compounds and representation of molecules			
			Concept of chirality and symmetry			
			Relative and absolute configuration			
			Optical activity of chiral compounds			
	CC1P1 - CHEMISTRY LAB- I		Separation	Dr. Sanjib Dey	20	1 st , 2 nd , 3 rd and 4 th month
			Determination of boiling point			
			Identification of a Pure Organic Compound			
	CC-2: PHYSICAL CHEMISTRY-I	Kinetic Theory and Gaseous state	Kinetic Theory of gases	Dr. Sanjib Dey	18	1 st month

			Maxwell's distribution of speed and energy			2 nd month
			Real gas and virial equation			3 rd month
		Chemical Thermodynamics	Zeroth and 1st law of Thermodynamics	Dr.Sabyasachi Khatua	29	1 st month, 2 nd month, 3 rd and 4 th month
			Thermochemistry			
			Second Law			
			Thermodynamic relations			
		Chemical kinetics	Rate law, order and molecularity	Dr. Sanjib Dey	8	4 th & 5 th month
			Role of T and theories of reaction rate			
			Homogeneous catalysis	Dr. Sanjib Dey	4	5 th month
			Autocatalysis; periodic reactions			
	C 2P2 : CHEMISTRY LAB-II		Experiment 1: Determination of pH of unknown solution (buffer), by color matching method	Dr.Sabyasachi Khatua	2	1 st month
			Experiment 2: Determination of heat of neutralization of a strong acid by a strong base	Dr.Sabyasachi Khatua	2	1 st month
			Experiment 3: Study of kinetics of acid-catalyzed hydrolysis of methyl acetate	Dr.Sabyasachi Khatua	2	2 nd month
			Experiment 4: Study of kinetics of decomposition of H ₂ O ₂	Dr.Sabyasachi Khatua	2	2 nd month

			Experiment 5: Determination of heat of solution of oxalic acid from solubility measurement	Dr.Sabyasachi Khatua	2	3 rd month
	GE-1	Inorganic Chemistry-I	Atomic Structure	Dr. Sanjib Dey	06	1 st month
			Chemical Periodicity	Dr. Sanjib Dey	05	2 nd month
			Acids and bases	Dr.Sabyasachi Khatua	04	3 rd month
			Redox reactions	Dr.Sabyasachi Khatua	03	4 th month
		Organic Chemistry-I	Fundamentals of Organic Chemistry	Sudip Maity	03	1 st month
			Stereochemistry		06	2 nd month
			Nucleophilic Substitution and Elimination Reactions	Sudip Maity	05	3 rd month
			Aliphatic Hydrocarbons Alcohol, Phenol, Ethers	Sudip Maity	08	4 th and 5 th month
	GE1 P1: LAB	Inorganic Chemistry –LAB	Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture.	Dr. Sanjib Dey	2	1 st month
			Estimation of oxalic acid by titrating it with KMnO ₄	Dr. Sanjib Dey	2	1 st month
			Estimation of water of crystallization in Mohr's salt by titrating with KMnO ₄	Dr. Sanjib Dey	2	2 nd month
			Estimation of Fe (II) ions by titrating it with K ₂ Cr ₂ O ₇ using internal indicator	Dr. Sanjib Dey	2	2 nd month
			Estimation of Cu (II) ions iodometrically using Na ₂ S ₂ O ₃	Dr. Sanjib Dey	2	3 rd month
		Organic Chemistry- LAB	Experiment A: Detection of special elements (N, Cl, and S) in organic			

			compounds.			
			Experiment B: Solubility and Classification (solvents: H ₂ O, dil. HCl, dil. NaOH)	Dr. Sanjib Dey	6	4 th and 5 th month
			Experiment C: Detection of functional groups: Aromatic-NO ₂ , Aromatic -NH ₂ , - COOH, carbonyl (no distinction of -CHO and >C=O needed), - OH (phenolic) in solid organic compounds.			
			Experiments A - C with unknown (at least 6) solid samples containing not more than two of the above type of functional groups should be done.	Dr. Sanjib Dey	2	4 th and 5 th month
Semester-II	CC-3: INORGANIC CHEMISTRY-I	INORGANIC CHEMISTRY-I	Extra nuclear Structure of atom	Dr. Sanjib Dey	6	1 st and 2 nd month
			Chemical periodicity	Dr. Sanjib Dey	4	3 rd month
			Acid-Base reactions	Dr.Sabyasachi Khatua	5	3 rd and 4 th month
			Redox Reactions and precipitation reactions	Dr.Sabyasachi Khatua	6	4 th month
	C3P: CHEMISTRY (LAB)		Acid and Base Titrations	Dr.Sabyasachi Khatua	7	1 st , 2 nd and 3 rd month
			Oxidation-Reduction Titrimetric	Dr.Sabyasachi Khatua	6	1 st , 2 nd and 3 rd month
	C4T ORGANIC CHEMISTRY-II	Stereochemistry II	Chirality arising out of stereoaxis	Sudip Maity	13	1 st month
			Concept of prostereoisomerism: prostereogenic centre			2 nd and 3 rd month

			Conformation:			
			conformational analysis			4 th month
		General Treatment of Reaction Mechanism II	Reaction thermodynamics	Sudip Maity	3	3 rd month
			Concept of organic acids and bases	Sudip Maity	4	1 st month
			Tautomerism	Sudip Maity	5	2 nd and 3 rd month
			Reaction kinetics			
		Substitution and Elimination Reactions	Free-radical substitution reaction	Sudip Maity	18	1 st month
			Nucleophilic substitution reactions			2 nd and 3 rd month
			Elimination reactions			4 th and 5 th month
	C4P: CHEMISTRY (LAB)		Organic Preparations, Purification of the crude product & Melting point	Dr. Sanjib Dey	24	1 st , 2 nd , 3 rd 4 th month
	GE-2	Physical Chemistry -I	Kinetic Theory of Gases and Real gases	Dr. Sabyasachi Khatua	20	1 st , 2 nd , 3 rd and 4 th month
			Liquids			
			Solids			
			Chemical Kinetics			
		Inorganic Chemistry- II	Ionic Bonding	Dr. Sanjib Dey	15	1 st , 2 nd 3 rd 4 th and 5 th month
			Covalent bonding			
			Concept of resonance and resonating structures in various inorganic and organic compounds. MO Approach			
			Comparative study of p-block elements:	Dr. Sabyasachi Khatua	6	
	GE2 P-LAB	Physical Chemistry-LAB	Surface tension measurement	Dr. Sabyasachi Khatua	4	1 st and 2 nd

			Viscosity measurement			month
			Study the kinetics of the following reactions	Dr.Sabyasachi Khatua	2	1 st month
		Inorganic Chemistry-LAB	Qualitative semimicro analysis of mixtures containing three radicals	Dr.Sabyasachi Khatua	6	2 nd , 3 rd and 4 th month
Semester-III	CC-5: Physical Chemistry-II	Transport processes	Fick's law	Dr.Sabyasachi Khatua	02	1 st and 2 nd month
			Viscosity	Dr.Sabyasachi Khatua	03	
			Conductance and transport number	Dr. Sanjib Dey	04	
		Applications of Thermodynamics – I	Partial properties and Chemical potential	Dr.Sabyasachi Khatua	04	3 rd , 4 th and 5 th month
			Chemical Equilibrium	Dr. Sanjib Dey	05	
			Nernst's distribution law;	Dr.Sabyasachi Khatua	02	
			Chemical potential and other properties of ideal substances- pure and mixtures	Dr.Sabyasachi Khatua	04	
			Condensed Phase	Dr.Sabyasachi Khatua	03	
		Foundation of Quantum Mechanics	Beginning of Quantum Mechanics	Dr. Sanjib Dey	5	
			Wave function			
			Concept of Operators	Dr. Sanjib Dey	7	2 nd , 3 rd and 4 th month
			Particle in a box			
			Simple Harmonic Oscillator			
	C5P: Physical Chemistry-II Lab		Experiment 1: Study of viscosity of unknown liquid (glycerol, sugar) with respect to water			1 st month

			Experiment 2: Determination of partition coefficient for the distribution of I ₂ between water and CCl ₄	Dr.Sabyasachi Khatua	12	1 st month
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			Experiment 3: Determination of K _{eq} for KI + I ₂ = KI ₃ , using partition coefficient between water and CCl ₄			2 nd month
			Experiment 4: Conductometric titration of an acid (strong, weak/monobasic, dibasic) against base strong			2 nd month
			Experiment 5: Study of saponification reaction conductometrically			3 rd month
			Experiment 6: Verification of Ostwald's dilution law and determination of K _a of weak acid			3 rd month
	C6T: Inorganic Chemistry-II	Chemical Bonding-I	Ionic bond	Dr. Sanjib Dey	4	1 st and 2 nd month
			Covalent bond	Sudip Maity	4	2 nd and 3 rd month
		Chemical Bonding-II	Molecular orbital concept of bonding	Dr. Sanjib Dey	12	2 nd and 3 rd month
			Metallic Bond			4 th month
			Weak Chemical Forces			4 th month
			Radioactivity	Dr.Sabyasachi Khatua	6	3 rd month
	C6P: Inorganic Chemistry-II - Lab		Iodo-/ Iodimetric Titrations	Dr. Sanjib Dey	10	1 st and 2 nd and 3 rd month
			Estimation of metal content in some selective samples	Dr. Sanjib Dey	6	2 nd month
	C7T: Organic Chemistry-III	Chemistry of alkenes and alkynes	Addition to C=C	Sudip Maity	14	1 st , 2 nd and 3 rd month
			Addition to C≡C (in comparison to C=C)			
		Aromatic Substitution	Electrophilic aromatic substitution	Sudip Maity	8	4 th and 5 th month

			Nucleophilic aromatic substitution			
		Carbonyl and Related Compounds	Addition to C=O:	Sudip Maity	18	1 st month
			Exploitation of acidity of α -H of C=O:			2 nd month
			Elementary ideas of Green Chemistry			3 rd month
			Nucleophilic addition to α,β -unsaturated carbonyl system			4 th month
			Substitution at sp ² carbon (C=O system)			5 th month
			Organometallics	Sudip Maity	4	5 th month
	C7P: Organic Chemistry-III – Lab		Qualitative Analysis of Single Solid Organic Compounds	Dr. Sanjib Dey	24	1 st , 2 nd , 3 rd and 4 th month
	SEC-1: Pharmaceutical Chemistry		Drugs & Pharmaceuticals	Sudip Maity	15	1 st , 2 nd and 3 rd month
			Fermentation			4 th month
	SEC1P: Pharmaceutical Chemistry		Preparation of Aspirin and its analysis	Dr. Sanjib Dey	4	1 st month
			Preparation of magnesium bisilicate (Antacid).			2 nd month
	GE3T: Chemical Energetics,	Physical Chemistry-II	Chemical Energetics	Dr. Sabyasachi Khatua	6	1 st & 2 nd Month
		Equilibria	Chemical Equilibrium	Dr. Sabyasachi Khatua	5	3 rd & 4 th month
			Ionic Equilibria			
		Organic Chemistry-II	Aromatic Hydrocarbons	Sudip Maity	4	3 rd month
			Organometallic Compounds	Sudip Maity	4	3 rd month
			Aryl Halides	Sudip Maity	6	4 th and 5 th month
			Alcohols, Phenols and Ethers			
			Carbonyl Compounds	Sudip Maity	4	3 rd and 4 th month
	GE-3P	Physical Chemistry-LAB	Thermochemistry	Dr. Sanjib Dey	6	1 st , 2 nd and 3 rd month
			Ionic Equilibria			

		Organic Chemistry-LAB	Identification of a pure organic compound	Dr. Sanjib Dey	10	1 st , 2 nd and 3 rd month
Sem-IV	C8T: PHYSICAL CHEMISTRY-III	Application of Thermodynamics – II	Colligative properties	Dr. Sanjib Dey	10	1 st month
			Phase rule			2 nd month
			Binary solutions			3 rd month
		Electrical Properties of molecules	Ionic equilibria	Dr. Sanjib Dey	04	4 th and 5 th month
			Electromotive Force & Dipole moment and polarizability	Dr. Sabyasachi Khatua	08	1 st & 2 nd month
					02	3 rd month
		Quantum Chemistry	Angular momentum	Dr. Sabyasachi Khatua	12	3 rd , 4 th . and 5 th month
			Qualitative treatment of hydrogen atom and hydrogen-like ions			
			LCAO and HF-SCF			
	C8P : Lab		Experiment 1: Determination of solubility of sparingly soluble salt in water, in electrolyte with common ions and in neutral electrolyte (using common indicator)	Dr. Sabyasachi Khatua	12	1 st month
			Experiment 2: Potentiometric titration of Mohr's salt solution against standard K ₂ Cr ₂ O ₇ solution			1 st month
			Experiment 3: Determination of K _{sp} for AgCl by potentiometric titration of AgNO ₃ solution against standard KCl solution			2 nd month
			Experiment 4: Effect of ionic strength on the rate of Persulphate – Iodide			2 nd month

			reaction			
			Experiment 5: Study of phenol-water phase diagram			3 rd month
			Experiment 6: pH-metric titration of acid (mono- and di-basic) against strong base			3 rd month
	C9T: INORGANIC CHEMISTRY-III		General Principles of Metallurgy	Sudip Maity	4	1 st month
			Chemistry of s and p Block Elements	Dr. Sabyasachi Khatua	16	1 st and 2 nd month
			Noble Gases			3 rd month
			Inorganic Polymers	Dr. Sanjib Dey	4	1 st month
			Coordination Chemistry-I	Dr. Sanjib Dey	12	3 rd , 4 th and 5 th month
	C9P: LAB		Complexometric titration	Dr. Sanjib Dey	10	1 st , 2 nd and 3 rd month
			Inorganic preparations	Dr. Sanjib Dey	10	1 st , 2 nd and 3 rd month
	C10T: ORGANIC CHEMISTRY-IV	Nitrogen compounds	Amines: Aliphatic & Aromatic	Sudip Maity	8	1 st month
			Nitro compounds (aliphatic and aromatic)			1 st month
			Alkyl nitrile and isonitrile			2 nd month
			Diazonium salts and their related compounds			2 nd month
		Rearrangements	Rearrangement to electron-deficient carbon	Sudip Maity	10	3 rd month
			Rearrangement to electron-deficient nitrogen			3 rd month
			Rearrangement to electron-deficient oxygen			4 th month
			Aromatic rearrangements			4 th month

			Rearrangement reactions by green approach			5 th month
		The Logic of Organic Synthesis	Retrosynthetic analysis	Sudip Maity	10	1 st month
			Strategy of ring synthesis			2 nd month
			Asymmetric synthesis			3 rd month
		Organic Spectroscopy	UV Spectroscopy	Sudip Maity	14	4 th month
			IR Spectroscopy			4 th month
			NMR Spectroscopy			5 th month
	C10P : LAB		1. Estimation of glycine by Sørensen's formol method	Dr. Sanjib Dey	6	1 st month
			2. Estimation of glucose by titration using Fehling's solution			1 st month
			3. Estimation of sucrose by titration using Fehling's solution			2 nd month
			4. Estimation of vitamin-C (reduced)			2 nd month
			5. Estimation of aromatic amine (aniline) by bromination (Bromate-Bromide) method			3 rd month
			6. Estimation of phenol by bromination (Bromate-Bromide) method			3 rd month
			7. Estimation of formaldehyde (Formalin)	Dr. Sanjib Dey	4	1 st month
			8. Estimation of acetic acid in commercial vinegar			1 st month
			9. Estimation of urea (hypobromite method)			2 nd month

			10. Estimation of saponification value of oil/fat/ester			3 rd month
	SEC-2T CHEMISTRY OF COSMETICS & PERFUMES		All	Sudip Maity	12	1 st , 2 nd , 3 rd and 4 th month
	SEC-2P: CHEMISTRY OF COSMETICS & PERFUMES Practical		Practical (ALL)	Dr. Sanjib Dey	8	1 st , 2 nd and 3 rd month
	GE4T	Physical Chemistry-III	Solutions	Dr. Sabyasachi Khatua	18	1 st , 2 nd , 3 rd and 4 th month
			Phase Equilibria			
			Conductance			
			Electromotive force			
		Analytical and Environmental Chemistry	Chemical Analysis			
			Environmental Chemistry	Sudip Maity	8	1 st , 2 nd , 3 rd month
	GE4P: Practical		Distribution Law	Dr. Sanjib Dey	16	1 st . 2 nd . 3 rd , and 4 th month
			Phase equilibri			
			Conductance			
			Potentiometry			
			Analytic and Environmental Chemistry-LAB			
Semester-V	C11T: Inorganic Chemistry - IV		Coordination Chemistry-II	Dr. Sanjib Dey	20	1 st , 2 nd and 3 rd month
			Transition Elements:	Sudip Maity	10	3 rd and 4 th month
			Lanthanoids and Actinoids:	Sudip Maity		
	C11P : LAB		Chromatography of metal ions	Dr. Sanjib Dey	10	1 st month
			Gravimetry			2 nd month

			Spectrophotometry			3 rd month
	C12T: Organic Chemistry - V		Carbocycles and Heterocycles	Sudip Maity	16	1 st and 2 nd month
			Cyclic Stereochemistry			3 rd month
			Pericyclic reactions	Sudip Maity	10	1 st , 2 nd and 3 rd month
			Carbohydrates	Sudip Maity	8	4 th and 5 th month
			Bio-molecules	Sudip Maity	8	4 th month
	C12P : LAB		Chromatographic Separations	Sudip Maity	6	1 st and 2 nd month
			Spectroscopic Analysis of Organic Compounds	Sudip Maity	6	1 st and 2 nd month
	DSE1T: Advanced Physical Chemistry		Crystal Structure	Dr. Sanjib Dey	6	1 st , 2 nd and 3 rd month
			Statistical Thermodynamics	Dr. Sabyasachi Khatua	6	1 st , 2 nd and 3 rd month
			Special selected topics	Dr. Sabyasachi Khatua	8	4 th and 5 th month
	DSE1P: Advanced Physical Chemistry		Programming	Dr. Sabyasachi Khatua	10	1 st , 2 nd and 3 rd month
	DSE2T: Analytical Methods in Chemistry		Qualitative and quantitative aspects of analysis	Dr. Sabyasachi Khatua	4	1 st month
			Optical methods of analysis	Dr. Sabyasachi Khatua	6	2 nd month
			Thermal methods of analysis	Dr. Sabyasachi Khatua	6	3 rd month
			Electroanalytical methods	Dr. Sanjib Dey	4	4 th month
			Separation techniques	Sudip Maity	10	3 rd , 4 th and 5 th month
	DSE2P: Analytical Methods in Chemistry (lab)		Separation Techniques	Sudip Maity	08	1 st and 2 nd month

			Solvent Extractions:	Dr. Sanjib Dey	04	3 rd month
			Spectrophotometry	Dr. Sabyasachi Khatua	06	4 th and 5 th month
Sem-VI	C13T: Inorganic Chemistry-V		Organometallic Chemistry	Dr. Sanjib Dey	12	1 st and 2 nd month
			Bioinorganic Chemistry	Sudip Maity	12	1 st and 2 nd month
			Catalysis by Organometallic Compounds	Sudip Maity	4	3 rd month
			Reaction Kinetics and Mechanism	Dr. Sanjib Dey	4	3 rd month
	C13P: LAB		Qualitative semimicro analysis of mixtures containing four radicals. Emphasis should be given to the understanding of the chemistry of different reactions and to assign the most probable composition	Dr. Sanjib Dey	20	1 st -5 th month
	C14T: Physical Chemistry-V		Molecular Spectroscopy	Dr. Sabyasachi Khatua	12	1 st and 2 nd month
			Photochemistry	Dr. Sanjib Dey	14	1 st month
			Surface phenomenon			2 nd and 3 rd month
	C14P : LAB		Practical	Dr. Sabyasachi Khatua	12	1 st , 2 nd and 3 rd month
	DSE- 3: Inorganic Materials of Industrial Importance		Silicate Industries	Dr. Sanjib Dey	8	1 st month
			Fertilizer	Dr. Sanjib Dey	14	2 nd , 3 rd and 4 th month
			Surface Coatings	Dr. Sanjib Dey		
			Batteries	Dr. Sanjib Dey		
			Alloys	Dr. Sabyasachi Khatua		
			Catalysis	Dr. Sabyasachi Khatua		
			Chemical explosives	Dr. Sabyasachi Khatua		

	DSE3P: LAB		Practical	Dr. Sanjib Dey	12	1 st , 2 nd and 3 rd month
	DSE4T: Polymer Chemistry		Introduction and history of polymeric materials	Sudip Maity	3	1 st month
			Functionality and its importance	Sudip Maity	3	1 st month
			Kinetics of Polymerization	Dr. Sabyasach Khatua	3	2 nd month
			Crystallization and crystallinity	Dr. Sabyasach Khatua	3	2 nd month
			Nature and structure of polymers:	Dr. Sabyasach Khatua	3	2 nd month
			Determination of molecular weight of polymers	Dr. Sabyasach Khatua	3	3 rd month
			Glass transition temperature (T _g) and determination of T _g	Dr. Sabyasach Khatua	3	3 rd month
			Polymer Solution	Dr. Sabyasach Khatua	3	4 th month
			Properties of Polymer	Sudip Maity	3	4 th month
	DSE4P: LAB		Polymer synthesis	Sudip Maity	16	1 st month
			Polymer characterization			2 nd month
			Polymer analysis			3 rd month

